

**REMARKS**

The amendment of claim 2 is supported on page 1, lines 11 to 13 of the specification with respect to the broad class of coated articles, page 14, lines 5 to 14 of the specification and original claims 5 and 6 with respect to the base material of the polymer binder, and page 14, lines 21 to 27, page 19, line 22, page 32, line 16, and page 34, line 12 of the specification with respect to the solution-forming agent or solvent. The amendments of the other claims are consistent with the amendment of claim 2 and are self-explanatory.

The foregoing amendment is a good faith effort to change the form and scope of the claims as suggested by the Examiner in paragraph 34 on page 11 of the Office Action.

Reconsideration of the application, as amended, is respectfully requested.

Claims 1 and 7 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Apparently, claim 2 rather than claim 1 was intended for this rejection since claim 1 was cancelled before the

Office Action was issued. In any case, the rejection is believed to be overcome by the amendment of claim 2 to substitute the term “solvent” for “solution forming agent” and the cancellation of claim 7.

Claims 2 to 26 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Craven (U.S. 3,878,147) in view of The Encyclopedia of Polymer Science, Vo. 3, November 1985, pg. 552. This is a repetition of the same rejection as that made in the previous Office Action of February 28, 2002 against which applicant presented detailed arguments in the amendment of June 28, 2002. Such arguments are still believed to apply to these claims as changed by this amendment and have not been addressed in the outstanding Office Action. Thus, as pointed out in the remarks of the last amendment, Craven discloses compositions comprising an elastomer, a solvent for the elastomer, and dispersed, hard, inorganic particles, which are intended to be applied to surfaces such as vehicle tires and the soles of footwear for the sole purpose of increasing the friction between the described surfaces and roads and the like made slippery by sleet, snow or ice. In contrast, while applicant's compositions are also capable of providing improved traction on slippery surfaces, they actually have a much broader purpose, namely to provide improved energy efficiency in the operation of the coated articles such as tires on surfaces under a variety of conditions including wet and dry as well

as icy surfaces. This is manifested in different ways, as shown in the data of Tables 1 to 5, such as improved fuel consumption, traveling time, traveling distance and number of accelerator operations when applicant's composition is applied to the surface, as compared with conditions when such composition is not applied.

The improvements contributed by applicant's coating are dependent on certain conditions including primarily two which are not disclosed by Craven, namely a thickness of the film resulting from the coating of 10  $\mu\text{m}$  or less, and a viscosity of the polymer of making up such film of 100,000 cp or less. Of these conditions, the most critical is the thickness of the film which is based on applicant's discovery that the thinner the film, the greater the energy conservation even at thickness somewhat under 10  $\mu\text{m}$ . However, 10  $\mu\text{m}$  is a practical maximum of film thickness for the purpose at hand and such maximum thickness is generally lower than any film coating for the improvement of traction known in the prior art.

Turning now to the specific points raised in the outstanding Office Action with regard to this rejection, the refusal to consider certain limitations because they are directed "toward the intended use of a claimed composition", which intended

use does not result in any structural difference in the claimed invention, as stated paragraphs 6 and 7 of the Office action, are believed to be overcome by the amendment of the claims to recite a coated article rather than a mere intention to use the composition in coating an article.

The assertions in paragraphs 8 and 26 of the Office Action that the limitations “which are generated by condensation action of an external substance during adhesion” in claim 6, and “wherein said external substance is water” in claim 26, do not appear to be further limiting, as far as the structure of the product in concerned”, are respectfully traversed. Thus, it is submitted that the ability of an external substance such as water to affect the polymerization and therefore the degree of adhesiveness of certain polymers is well known in the art so that such limitations act to identify specific subgroups of polymers within certain categories, and the questioned limitations are indeed significant when recited in a patent claim.

The description regarding claim 2 in paragraph 9 of the Office Action of various features of the Craven disclosure followed by the conclusion that since “Craven teaches a mixture comprising a polymeric binder and solvent, the compositional limitations of claim 2 are met” is believed to be overcome by the amendment of claim 2 to recite a coated article. Thus, paragraph 9 of the Action

says nothing about the maximum thickness of applicant's film of 10  $\mu\text{m}$  or a maximum viscosity of the film of 100,000 cp which were pointed out previously as the main distinguishing features between applicant's thin film coating and the coating of Craven. Note that the thickness of the film is critical to applicant's achieving improved energy efficiency, as discussed hereinbefore in connection with the significance of this feature, rather than merely improving traction on a slippery surface as in Craven. The foregoing analysis also applies to apply to the limitations regarding component percentages in claims 12 and 13 discussed in paragraph 21 and 22 of the Office Action, and the ranges of film viscosity and film thickness in claims 14-19 discussed in paragraph 23 of the Office Action.

Finally with regard to paragraph 9 of the Office Action, it should be pointed out that the disclosure by Craven of a particle size of inorganic particles of 0.2 - 105  $\mu\text{m}$  is entirely irrelevant to the thickness of the film, which is stated by Craven to be in the range of 0.5 - 5 mils, or a minimum of 12.7  $\mu\text{m}$ , which is 27% greater than applicant's maximum of 10  $\mu\text{m}$ .

The assertions in paragraph 10 of the Office Action regarding claim 3 that Craven discloses that the elastomer Kraton 1102 has a viscosity in solution of 400 cp, and the assertion in paragraph 24 concerning lower viscosities recited in claims

20 to 22 are believed not to render obvious applicant's maximum viscosity of polymer solution of 100 cp recited in claim 3 or lower viscosities in claims 20 to 22 discussed in paragraph 24 of the Office Action since the lowest viscosity disclosed by Craven is 300% higher than the maximum claimed by applicant. Furthermore, this difference cannot be explained away, as stated in paragraph 12 of the Office Action, by the disclosure of the Encyclopedia reference of various coating methods and the ranges of viscosity of such coatings, on the ground that the viscosity "is a results effective variable" and that "It would have been obvious to one with ordinary skill in the art to optimize the viscosity of the coating composition to meet the requirements of the coating method to be utilized." With regard to this position, it should be noted that the Encyclopedia does not disclose anything which would lead the skilled person to decrease the minimum film thickness of 12.7  $\mu\text{m}$ , disclosed by Craven to applicant's maximum of 10  $\mu\text{m}$  and that, with regard to optimization, it is not the method of application that is important, but rather the results obtained in terms of energy consumption efficiency. Note that this is not an arbitrary distinction in view of the results in energy efficiency shown in Tables 1 to 5 of applicant's specification and that an application of the broad concept of energy efficiency is not shown in either Craven or Encyclopedia. In view of this, it is not seen how the teachings of the references

could be combined so as to render applicant's invention obvious to a person skilled in the art.

The fact that, as pointed out in paragraph 13 of the Office Action, Craven discloses inorganic particles having a particle size as low as 0.2 micron, does not suggest the average particle diameter of 10  $\mu\text{m}$  or less recited in applicant's claim 4 in the context of Craven's overall disclosure, despite the statement that the particle size of some particles may be as low as 0.2 or 5 microns. Note that the most preferable range is 10 to 44 microns. In this context, the person skilled in the art is likely to interpret the disclosure as suggesting an average size much higher than 10 microns. In any case, the disclosure by Craven of particle size limits which may include some particles within applicant's range does not overcome the other distinctions between applicant's coated articles and those disclosed by Craven, particularly the maximum thickness of applicant's polymer film of 10  $\mu\text{m}$ , as discussed previously. It should be noted, in this connection, that the presence in applicant's coatings of an anti-slipping agent comprising fine particles as recited in claim 4, is very beneficial to the purpose of achieving high energy consumption efficiency, a purpose not suggested by Craven. This analysis also applies to paragraph 25 of the Office Action regarding claims 23 to 25.

Referring to paragraphs 14 to 18 of the Office Action which point out that Craven discloses some of the same components as those utilized in applicant's energy consumption improving agent mixture, such as polyurethane recited in claims 5 and 6, the solvent recited in claim 16, and the antislipping agents recited in claim 8, such disclosures have no bearing on the critical distinctions between applicant's coated articles and those disclosed by Craven, particularly applicant's maximum film thickness of 10  $\mu\text{m}$ , as discussed previously in this paper.

In paragraphs 19 and 20 of the Office Action, the method recited in applicant's claim 9 and the article in claim 11 are discussed in comparison with specific points of Craven's disclosure, and it is again concluded that the thickness of the film is a result effective variable and that it would have been obvious "to optimize the thickness of the film to suit the distance to be traveled". However, as brought out previously in a discussion of paragraphs 10 and 12 of the Office Action, this analysis is not valid since the desired result is different with applicant's disclosed coated articles and those disclosed by Craven. Thus, applicant desires improved energy consumption efficiency while Craven's purpose is improved traction. That applicant's purpose is achieved is shown by the results of Tables 1 to 5 on pages 37 to 42 of the specification. Since applicant's purpose is not disclosed or suggested in Craven, one having ordinary skill in the art would not be



led to alter Craven's method so as to arrive at applicant's conditions, in particular, applying the energy consumption efficiency improving agent mixture to the supported surface to obtain a film having a thickness of 10  $\mu\text{m}$  or less.

An analysis similar to that given in the preceding paragraph is also applicable to claim 12 discussed in paragraph 21 of the Office Action.

Claim 27 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Craven as modified by The Encyclopedia of Polymer Science as applied to claim 2 above, and further in view of Sakai et al. (U.S. 4,501,808). As discussed previously, Craven discloses the coating of vehicle tires and footwear to improve their traction on a slippery road. In contrast, Sakai et al. disclose an organic film comprising any of certain multi-cyclic compounds capable of absorbing laser beams effectively. Isopropanol is disclosed by Sakai et al. as a solvent among several others employed in a coating for the film. Based on this, the Office Action concludes that it would be obvious for a person skilled in the art to substitute isopropanol for any of the solvents disclosed by Craven. This rejection is respectfully traversed in view of the extreme differences between the films of Craven and Sakai et al. In view of these differences, it cannot be assumed without further evidence that a solvent used for one of the films can be substituted for any

of those known to be satisfactory for the other use with a reasonable likelihood of success.

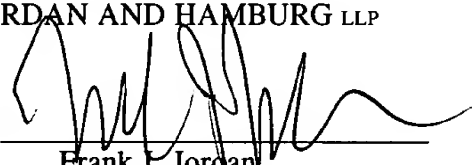
This application is now thought to be in condition for allowance and such action at an early date is earnestly solicited.

Applicant respectfully requests a one-month extension of time for responding to the Office Action. Please charge the fee of \$110.00 for a first one-month extension to Deposit Account No. 10-1250. In addition, charge any fee deficiency or credit any excess payment to Deposit Account No. 10-1250.

Respectfully submitted,

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Enc: Appendix I

**APPENDIX I****AMENDED CLAIMS WITH AMENDMENTS INDICATED THEREIN  
BY BRACKETS AND UNDERLINING**

2. (Twice Amended) An article improved in energy consumption efficiency having a contact surface to be brought into contact with a surface of a support, and a thin film formed on the contact surface by application of an energy consumption efficiency improving agent comprising a mixture of a flexible polymer binder and a [solution-forming agent,] solvent which is capable of diluting the binder, including a solvent which dilutes the binder by colloid formation, [which is] said efficiency improving agent being applied to [an object] said article in the form of a thin film having a viscosity of 100,000 cp or less and a thickness of 10  $\mu\text{m}$  or less,

and wherein a base material of said polymer binder is at least one selected from the group consisting of polyethylene; a methyl, phenyl, chloro, hydroxy, acetoxo, or cyano derivative of polyethylene; polybutadiene; a methyl or chloro derivative of polybutadiene; a copolymer of said polyethylene derivative and said butadiene derivative; silicone; polysulfide; polyurethane; modified silicone; modified epoxy resin; and modified acrylic resin which are generated by

condensation action of an external substance during adhesion; and said solvent is selected from the group consisting of methyl alcohol, denatured ethyl alcohol, isopropyl alcohol, propyl alcohol, acetic acid, and cyclohexane.

3. (Twice Amended) The [energy consumption efficiency improving agent] article according to claim 2, wherein said flexible polymer binder adheres to an organic material and an inorganic material and has a viscosity of 100,000 cp or less, and said [solution-forming agent] solvent is present in an amount resulting in the viscosity of the mixture being 100 cp or less.

4. (Twice Amended) The [energy consumption efficiency improving agent] article according to claim 2, said efficiency improving agent further comprising an antislipping agent comprising fine particles of an average particle diameter of 10  $\mu\text{m}$  or less.

5. (Twice Amended) The [energy consumption efficiency improving agent] article according to claim 2, wherein [a] said base material of the polymer binder is at least one selected from the group consisting of polyethylene; a methyl, phenyl, chloro, hydroxy, acetoxy, or cyano derivative of polyethylene; polybutadiene, a methyl or chloro derivative of polybutadiene; a copolymer of said

polyethylene derivative and said butadiene derivative; silicone; polysulfide; and polyurethane.

6. (Twice Amended) The [energy consumption efficiency improving agent] article according to claim 2, wherein a base material of the polymer binder is at least one selected from the group consisting of silicone; polysulfide; polyurethane; modified epoxy resin; and modified acrylic resin which are generated by condensation action of an external substance during adhesion.

8. (Twice Amended) The [energy consumption efficiency improving agent] article according to claim 4, wherein the antislipping agent is a finely particulate inorganic material mainly comprised of silicon oxide, aluminum oxide, cerium oxide, or silicon carbide, or a finely particulate organic material.

9. (Twice Amended) An energy consumption efficiency improving method, comprising applying [the] said energy consumption efficiency improving agent as set forth in any one of claims 2 to 6 and 8 to an object to form a thin film of 10  $\mu\text{m}$  or less on a surface of the object.

12. (Amended) The [energy consumption efficiency improving agent] article of claim 2 wherein said mixture contains 1.42 to 1.58 wt. % of said flexible polymer binder and 94.81 to 98.5 wt. % of said solution-forming agent.

13. (Amended) The [energy consumption efficiency improving agent] article of claim 4 wherein said mixture contains 0 to 3.77 wt. % of said antislipping agent.

14. (Amended) The [energy consumption efficiency improving agent] article of claim 2 wherein the viscosity of said thin film is 10,000 to 100,000 cp.

15. (Amended) The [agent] article of claim 14 wherein said viscosity is 10,000 to 50,000 cp.

16. (Amended) The [agent] article of claim 15 wherein said viscosity is 10,000 to 20,000 cp.

17. (Amended) The [energy consumption efficiency improving agent] article of claim 2 wherein said film has a thickness of 0.01 to 10  $\mu\text{m}$ .

18. (Amended) The [agent] article of claim 17 wherein said thickness is 0.01 to 1  $\mu\text{m}$ .

19. (Amended) The [agent] article of claim 18 wherein said thickness is 0.01 to 0.1  $\mu\text{m}$ .

20. (Article) The [energy consumption efficiency improving agent] article of claim 3 wherein the viscosity of said mixture due to the presence of [said solution-forming agent] solvent is 20 to 100 cp.

21. (Amended) The [agent] article of claim 20 wherein said viscosity is 20 to 50 cp.

22. (Amended) The [agent] article of claim 21 wherein said viscosity is 20 to 35 cp.

23. (Amended) The [energy consumption efficiency improving agent] article of claim 4 wherein said average particle diameter is 10 nm to 10  $\mu\text{m}$ .

24. (Amended) The [agent] article of claim 23 wherein said diameter is 10 nm to 1  $\mu$ m.

25. (Amended) The [agent] article of claim 24 wherein said diameter is 10 to 100 nm.

26. (Amended) The [energy consumption efficiency improving agent] article of claim 6 wherein said external substance is water.

27. (Amended) The [energy consumption efficiency improving agent] article of claim [7] 2 wherein said solvent is isopropyl alcohol.